



Digital Watershed

Changing Landscapes 2: Anticipating the Effects of Local Land Use Decisions

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Institute of Water Research
Michigan State University

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Madison, Wisconsin

<http://www.iwr.msu.edu>

Digital Watershed



The screenshot shows a web application titled "Digital Watershed" with a blue and green color scheme. The title is flanked by two circular logos. Below the title are three buttons: "address entry", "map entry", and "site info". The "address entry" button is selected. Below these buttons is a form titled "Please Type in Your Address :". The form contains four input fields: "Street Address:", "City:", "State:", and "Zip Code:". Below the input fields are two buttons: "Get Map" and "Clear".

Digital Watershed

address entry *map entry* *site info*

Please Type in Your Address :

Street Address:

City:

State:

Zip Code:



Topics

- Who am I/what do I represent?



Topics

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- 2 way exchange



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- Who am I/what do I represent?
- 2 way exchange
- Living with change



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- Who am I/what do I represent?
- 2 way exchange
- Living with change
- Introductions



Topics

- Who am I/what do I represent?
- 2 way exchange
- Living with change
- Introductions
- Information for decision making (“Spatial” Layers”)

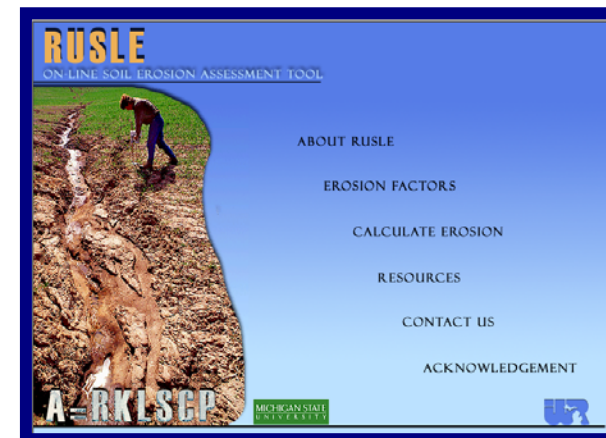


Topics

- Who am I/what do I represent?
- 2 way exchange
- Living with change
- Introductions
- Information for decision making (“Spatial” Layers”)
- Continually Evolving Systems

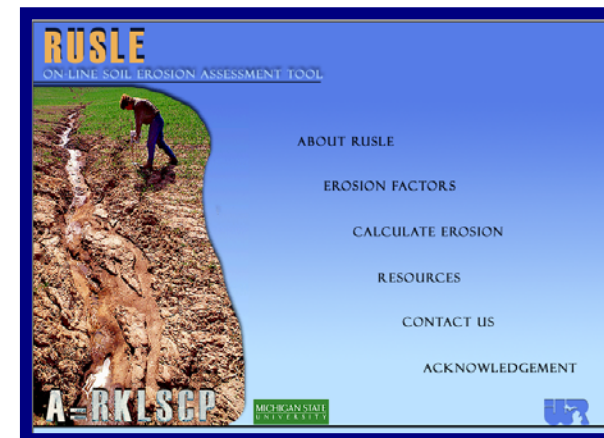
Topic(s) cont....

- Know Your Watershed
 - <http://www.hydra.iwr.msu.edu/water/>



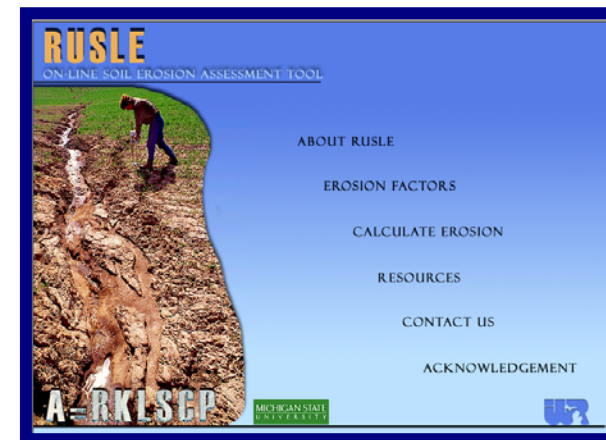
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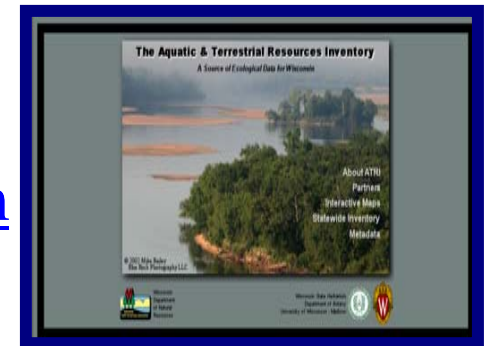
Topic(s) cont....

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- RUSLE
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- Group Discussion



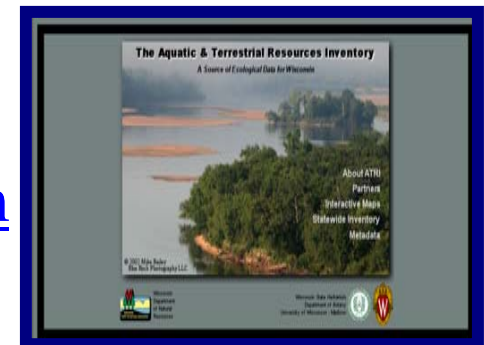
Topic(s) cont....

- Wisconsin Web Based Data
 - <http://maps.botany.wisc.edu/atri/indexIE.htm>



Topic(s) cont....

- Wisconsin Web Based Data
 - <http://maps.botany.wisc.edu/atri/indexIE.htm>
- Long-Term Hydrological Impact Assessment ([L-THIA](http://www.ecn.purdue.edu/runoff/lthianew))
 - <http://www.ecn.purdue.edu/runoff/lthianew>



Topic(s) cont....

- Digital Watershed
 - <http://www.iwr.msu.edu/dw>



The screenshot shows the 'Digital Watershed' web application. At the top, there is a header with the title 'Digital Watershed' in a stylized green font, flanked by two blue logos of a person holding a map. Below the header is a navigation bar with three buttons: 'address entry', 'map entry', and 'site info'. The 'address entry' button is currently selected. The main content area contains a form titled 'Please Type in Your Address :'. The form has four input fields: 'Street Address:', 'City:', 'State:', and 'Zip Code:'. Below these fields are two buttons: 'Get Map' and 'Clear'.

Topic(s) cont....

- Digital Watershed
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The screenshot shows the 'Digital Watershed' website interface. At the top, there is a logo with the text 'Digital Watershed' in a stylized green font, flanked by two blue icons of a person holding a map. Below the logo is a navigation bar with three buttons: 'address entry', 'map entry', and 'site info'. The 'address entry' button is highlighted. Below the navigation bar is a form titled 'Please Type in Your Address :'. The form contains four input fields: 'Street Address:', 'City:', 'State:', and 'Zip Code:'. Below these fields are two buttons: 'Get Map' and 'Clear'.

- Questions and [Answers](#)



Long-Term Hydrologic Impact Assessment (L-THIA) - Microsoft Internet Explorer provided by Purdue University

Address: <http://www.ecn.purdue.edu/runoff/>

Local Government Environmental Assistance Network

HOT TOPICS	WHAT'S NEW?	REGULATORY INFORMATION	TOOLS & RESOURCES	CALENDAR
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Land Use Impacts on Water Quality

As local land use decisionmakers, municipal and county leaders regularly measure the benefits and costs of development proposals. In addition to factors such as the extension of existing infrastructure and the delivery of government services, local officials are beginning to consider the impact that land use changes will have on a community's water quality.

Land use changes can significantly impact groundwater recharge, stormwater drainage, and water pollution. The Long-Term Hydrologic Impact Assessment (L-THIA) model was developed as an accessible online tool to assess the water quality impacts of land use change. Based on community-specific climate data, L-THIA estimates changes in recharge, runoff, and nonpoint source pollution resulting from past or proposed development. As a quick and easy-to-use approach, L-THIA's results can be used to generate community awareness of potential long-term problems and to support planning aimed at minimizing disturbance of critical areas. L-THIA is an ideal tool to assist in the evaluation of potential effects of land use change and to identify the best location of a particular land use so as to have minimum impact on a community's natural environment.

Basic L-THIA **Impervious L-THIA** **GIS L-THIA**

Differences Between the Models

- **Basic L-THIA**
Users only need to input their location, soil type, and the type of land use change taking place.
- **Impervious L-THIA**
Allows users to input the percentage of impervious cover of different land uses.
- **GIS L-THIA**
Enables users to download an ArcView GIS version of L-THIA for PCs.
- **Related Tools**
Other tools from the developers of L-THIA

[Background Information](#)

[FAQ](#)

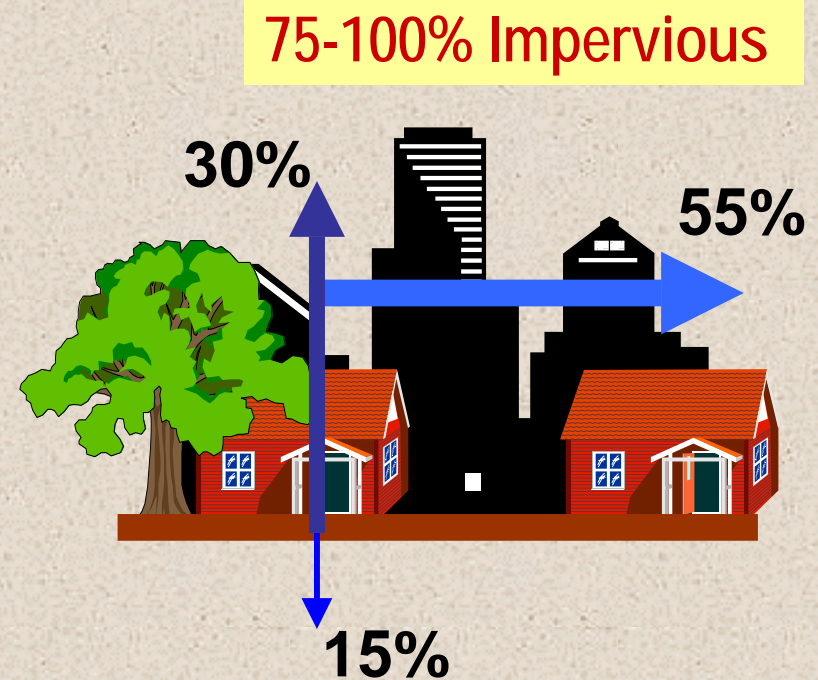
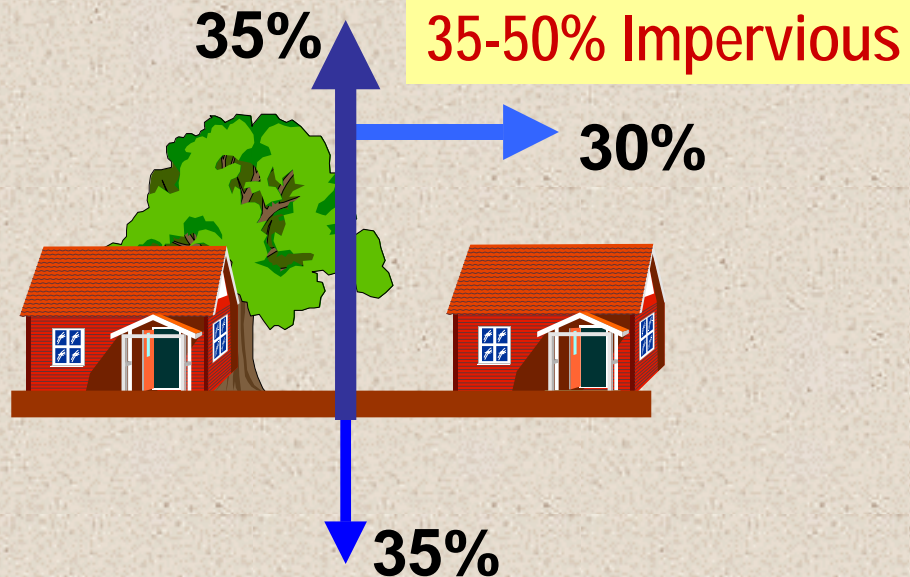
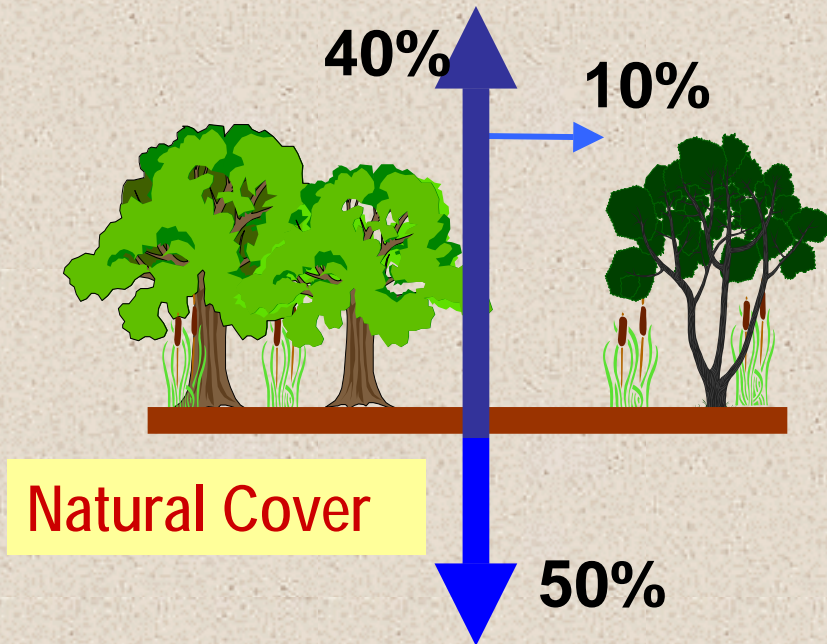
[Comments or Question](#)

Introducing Web-Based Decision Tools for Environmental Management To Lake Michigan Communities

By: Bernie Engel

Long-Term Hydrological Impact Assessment (L-THIA)

Land Use Decisions Affect Runoff, Recharge, and Water Quality



**Rivers Drying Up
Rivers Flooding
Water Polluted
Stream Banks Eroding**



Stream Ecology Changing

**Wells Running Dry
Wetland Habitat Shrinking**



Rivers Drying Up Rivers Flooding Water Polluted Str

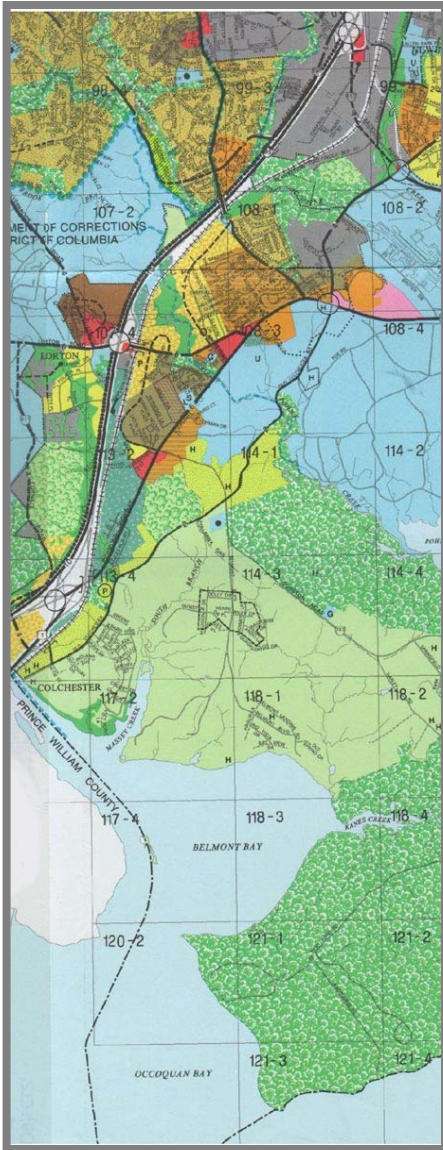


Most communities respond to this with a mix of reactive and proactive strategies, including planning

ry
inking



Planning



The most important, large-scale, proactive step:
Where you do it can be just as important as what you do

**Multifaceted – so how do
you bring environmental
concerns into this?**

Impact Assessment Tools



A little history....

Northeast Ohio, 1992: “Our wetlands are failing”

Local Planners: Need model to assess impact of land use change on hydrology.

Reality: Available models were data intensive and complex – and getting more so.

The Aim: To develop a user-friendly model using basic available data for land use and soils, in response to the needs of planners and local environmental groups.



L-THIA

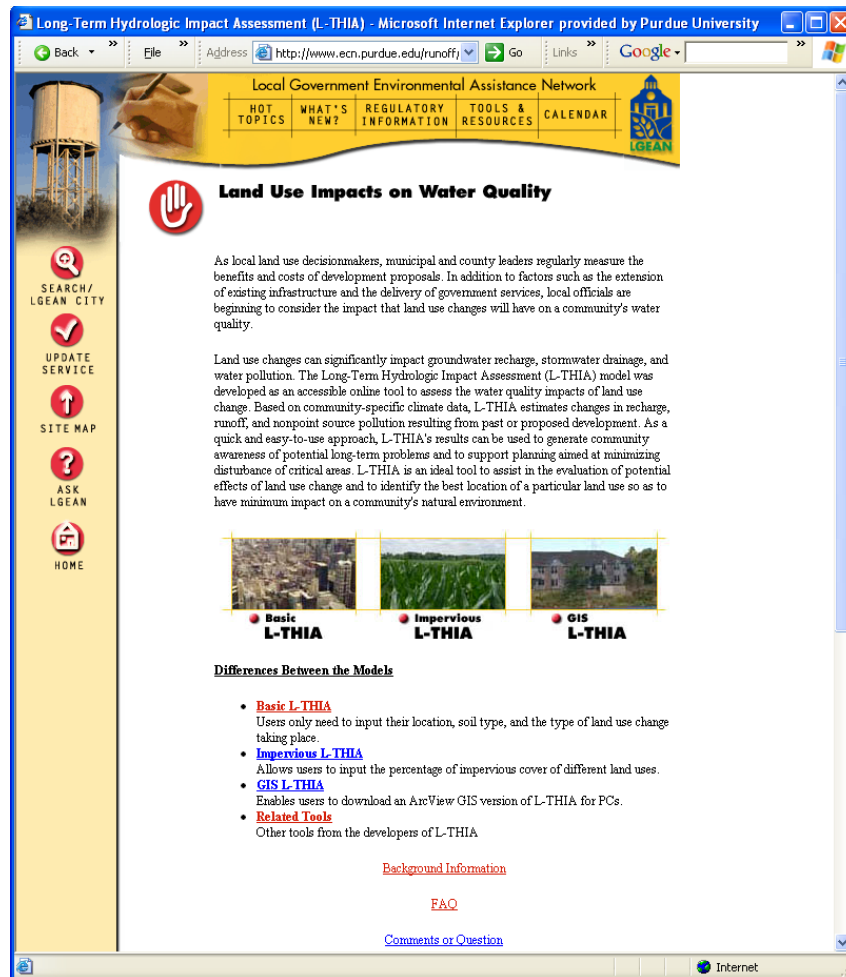
Based on the rainfall – land cover – runoff analysis method already used in many communities

Input: Land Use Pattern(s) + Soils Pattern

Process: Daily Runoff and Pollutant Loading Calculations (30 years)

Output: Average Annual Runoff and NPS loads for Specific Land Use Patterns

L-THIA



Originally a simple
spreadsheet program

Now a simple web
tool

GIS extension version also
available



Large-Scale Implementation

- ICMA (International City/County Management Association)

The image displays three screenshots of web browsers showing the LGEAN website and the L-THIA model interface.

Left Screenshot: Local Government Assistance Network - LGEAN

The browser shows the LGEAN homepage. The address bar is <http://www.lgean.org>. The page features the ICMA logo, the LGEAN logo, and a navigation menu with links: ABOUT LGEAN, LGEAN PARTNERS, ASK LGEAN, UPDATE SERVICE, SITE MAP, and SEARCH/LGEAN CITY. The page also mentions "Local Government Environmental Assistance Network" and "EPA Changes NSR Rules".

Middle Screenshot: Long-Term Hydrologic Impact Assessment (L-THIA)

The browser shows the L-THIA homepage. The address bar is <http://www.ecn.purdue.edu/runoff/>. The page features the L-THIA logo and a navigation menu with links: HOT TOPICS, WHAT'S NEW?, REGULATORY INFORMATION, TOOLS & RESOURCES, and CALENDAR. The page also mentions "Local Government Environmental Assistance Network".

Right Screenshot: L-THIA Basic Model

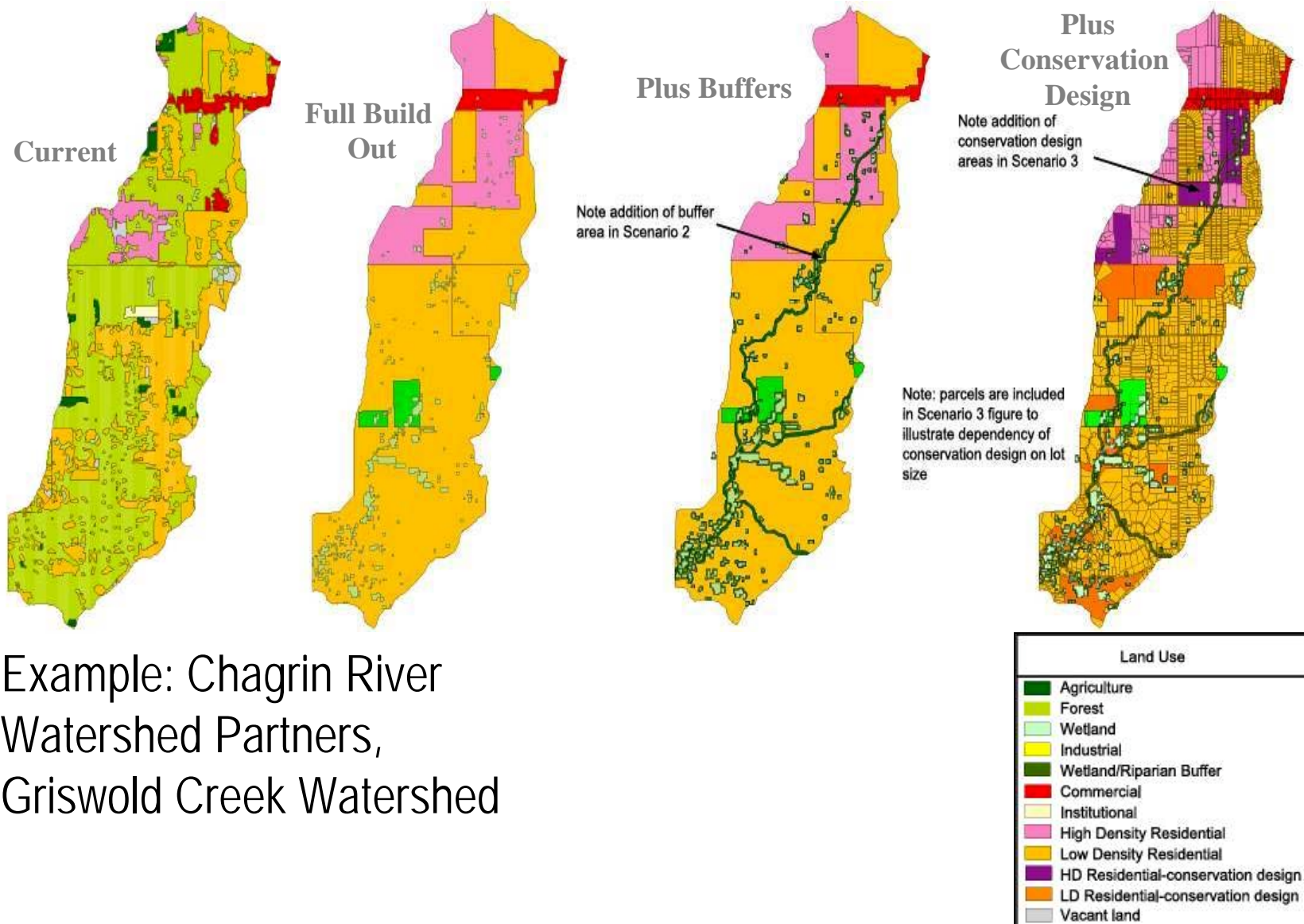
The browser shows the L-THIA Basic Model interface. The address bar is <http://www.lgean.org>. The page features the L-THIA logo and a navigation menu with links: Introduction, Location, Land Use Change, Results, and Interpreting the Results. The page also mentions "Step Three" and "Land Use Change Scenarios".



Example Applications of L-THIA

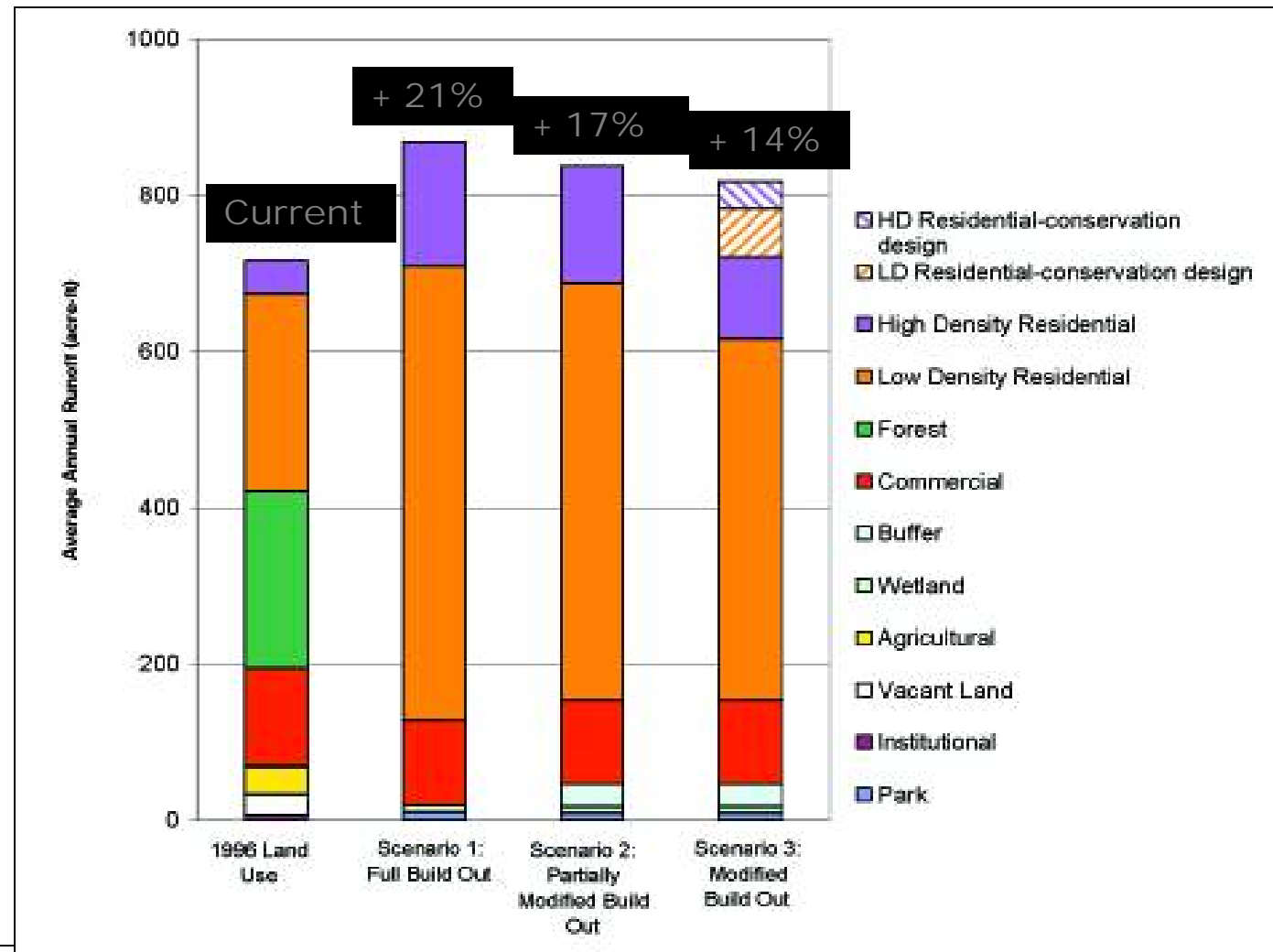
Impacts Assessment for:

- proposed land use change and wetland hydrology.
- residents downstream of a proposed land use change.
- tourism / agriculture transition impacts on a coastal watershed, Barbados.
- past and future land use change in an urban-rural fringe watershed, including impact fee assessment.
- Watershed scale implications of land use change for NPS pollution



Example: Chagrin River
Watershed Partners,
Griswold Creek Watershed

Proposed approaches would reduce
but not eliminate the impact





So how do you do it?

- L-THIA Web

Long-Term Hydrologic Impact Assessment (L-THIA) - Microsoft Internet Explorer provided by Purdue University

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Local Government Environmental Assistance Network

HOT TOPICS | WHAT'S NEW? | REGULATORY INFORMATION | TOOLS & RESOURCES | CALENDAR

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<http://www.ecn.purdue.edu/runoff/lthianew>



How is L-THIA Used?

- Near Columbus, OH – significance of urbanization on runoff and water quality
- Triangle Park, NC – comprehensive land use plan
- NASA KSC, FL – impacts of historical land use change
- Northeast OH – land use planning policy assessment
- Indianapolis, IN – historical impacts
- Kokomo, IN – TMDL development



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Digital Watershed

[address entry](#) [map entry](#) [site info](#)

Please Type in Your Address :

Street Address:

City:

State:

Zip Code:

Understanding Your Watershed:
An Interactive Mapping Program To Explore Michigan Watersheds

Understanding Your Watershed is an interactive web-based mapping program utilizing the capabilities of a Geographic Information System (GIS). The program enables a user to select a Michigan watershed and display various features within that watershed such as streets, water bodies, elevation, risk areas, wetlands and other information available across the state.

FREE Membership!

Login:

Password:

Thank

You!

Local Government Environmental Assessment Network

Land Use Impacts on Water Quality

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RUSLE
ON-LINE SOIL EROSION ASSESSMENT TOOL

ABOUT RUSLE

EROSION FACTORS

CALCULATE EROSION

RESOURCES

CONTACT US

ACKNOWLEDGEMENT

ARKLSCP MICHIGAN STATE UNIVERSITY

The Aquatic & Terrestrial Resources Inventory
A Source of Ecological Data for Wisconsin

About ATRI
Partners
Interactive Maps
Statewide Inventory
Metadata

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Blue Rock Photography LLC

Wisconsin Department of Natural Resources
Michigan State Herbarium
University of Wisconsin - Madison